

Brominated Epoxy Resin

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Bisphenol A type Epoxy Resin

Bisphenol F type Epoxy Resin

High Purity Epoxy Resin

Glycidyl Amino Type Epoxy Resin Dimer Acid / Rubber Modified

Type Epoxy Resins

Novolac Type

High Weatherable Epoxy Resin(Hidrogennated Bis-A Type)

Low Viscosity Epoxy

Resins(Trimethylol Propane Type)

Castings grade Epoxy Resins

Reactive Diluent/Modified Type Epoxy

Resins

Phenoxy Resins

Bisphenol A type Epoxy Resin "Epo Tohto YD series" Manufactured by Tohto Kasei co.,ltd.

"Epo Tohto" YD series is Tohto Kasei's epoxy resin which is based on bisphenol A and epichlorohydrin. The YD series is used for general purposes in such outlets as coatings, adhesives, buliding, and construction, electrical, nsulator, structural, molding and so forth.

| Epo Tohto | Epoxy equivalent weight | Viscosity (cps/ 25°C) | Color | Softening Point | Solution Viscosity | Description |
|-----------|-------------------------------|-----------------------------|------------|--------------------|-----------------------|---|
| 9,440 | (g/eq) | (mPa·s) | (gardner) | (℃) | (G- H) | · |
| YD-115 | 180-194 | 700-1100 | 1MAX | | | Low viscosity for general use |
| YD-115CA | 195-215 | 800-1600 | 1MAX | | | Non crystallizable & higher reactive |
| YD-127 | 180-190 | 8000- 11000 | 1MAX | | | Low viscosity standard resin |
| YD-128 | 184-194 | 12000- 15000 | 1MAX | | | Standard resin |
| YD-128G | 184-194 | 12000- 15000 | 1MAX | | | Less crystallizable |
| YD-128S | 205-225 | 19000- 24000 | 1MAX | | | Non- crystallizable |
| YD-128CA | 200-230 | 12000- 15000 | 1MAX | | | Non- crystallizable & higher reactive |
| YD-134 | 230-270 | | 1MAX | | O-U | Semi-solid for paints |

| | EPOXY_grade | edist | | | Softening, point | | Page 2 of 8 |
|---|-------------|-----------|--------|------|------------------|-------|--|
| | YD-011 | 450-500 | } ; | 1MAX | point 5 60-70 | D-F | Standard resin solid type |
| (| YD-012 | 600-700 | | 1MAX | 75-85) | G-K | High flow for powder coatings |
| | YD-013 | 800-900 | | 1MAX | 85-98 | O-S | For powder coating |
| | YD-014 | 900-1000 | | 1MAX | 91-102 | Q-U | For powder coating and epoxy esters |
| | YD-017 | 1750-2100 | | 1MAX | 117-127 | Y-Z1 | Higher reactivity for baking varnish |
| | YD-019 | 2400-3300 | | 1MAX | 130-145 | Z3-Z5 | For precoated metal(PCM) and can coatins |
| | YD-020N | 3800-4000 | | 1MAX | 135-150 | Z4-Z5 | For PCM and can coating |
| | YD-020H | 5000-5500 | | 1MAX | 145-160 | Z5-Z7 | For PCM and can coating |
| | YD-7011R | 460-490 | | 1MAX | 60-70 | D-F | High staiblty quolity, for synthesis |
| | YD-7017 | 1750-2100 | | 1MAX | 113-123 | Y-Z1 | For PCM, High adhesion |
| | YD-7019 | 3000-4000 | | 1MAX | 125-135 | Z2-Z4 | For PCM, High adhesion |
| | YD-901 | 450-500 | | 1MAX | 65-75 | E-G | Water resistance for laminates |
| (| YD-902 | 600-700 | | 1MAX | 82-92 | J-O | For powder coationgs |
| | YD-903N | 780-840 | | 1MAX | 92-102 | Q-U | For powder coationgs |
| | | | | | | | For powder |

| YD-904 | 900-1000 | 1MAX | 96-107 | T-W | coationgs |
|---------|-----------|------|---------|-------|----------------------|
| YD-907 | 1300-1700 | 1MAX | 117-127 | Y-Z2 | For powder coationgs |
| YD-909 | 1800-2500 | 1MAX | 129-145 | Z2-Z5 | For powder coationgs |
| YD-927H | 1850-2150 | 1MAX | 120-130 | Y-Z3 | High adhesion |
| YD-6020 | 3000-5000 | 1MAX | | Z6-Z7 | For PCM |

Bisphenol F type Epoxy Resin "Epo Tohto YDF series"

Bisphenol F type epoxy resins generally offer lower viscosity and more flexible than bisphenol A type epoxy counterparts.

| Epo Tohto grade | Epoxy equivalent weight | Viscosity (cps/ 25°C) | Color | Softening point | Description |
|--------------------|--|-----------------------------|-----------|-----------------|-------------------------------|
| | (g/eq) | (mPa·s) | (gardner) | (℃) | |
| | | 2000- | | | Standard resin for non- |
| YDF-170 | 160-180 | 5000 | 3MAX | | solution, high solid coatings |
| | | 3000- | | | |
| YDF-175S | 165-175 | 4000 | 3MAX | | Non-crystallizable |
| YDF-2001 | 450-500 | B-D | 3MAX | 50-60 | High flow for powder coating |
| YDF-2004 | 900-1000 | K-O | 3MAX | 80-90 | High flow for powder coating |
| Bisphenol A | Bisphenol A & F type High purity Epoxy Resin | | | | |
| Eng Tobto | Epoxy equivalent | Viscosity (cps/ | | | |
| Epo Tohto grade | weight | 25°C) | Color | | Description |
| | (g/eq) | (mPa·s) | (gardner) | | |
| | | 4000- | · | | |
| YD-8125 | 170-175 | 5000 | 1MAX | n = 0 puri | ty98%min BPA type |
| | | 1000- | | | |
| YDF-8170C | 155-165 | 2000 | 1MAX | n = 0 puri | ty98%min BPF type |
| | | 2000- | | | |
| ZX-1059 | 160-170 | 3000 | 1MAX | n = 0 puri | ty98%min |
| | | | | | |

O-Cresol Novolac Type Epoxy Resin "Epo Tohto YDCN series

The advantage of o-cresol novolac epoxy resins over other types of epoxy resin have long

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|---|-------------------------------|-----------------------------|---------------|---|--|
| been establis | hed in the outle | et requiring | tne nigner th | ermai stability and chemical resistance. | |
| Epo Tohto | Epoxy equivalent weight | Viscosity (cps/ 25°C) | Color | Description | |
| | (g/eq) | (mPa·s) | (gardner) | | |
| YDPN-638 | 170-190 | H-K | 3MAX | Phenol Novalac type for general use | |
| YDCN-701 | 195-220 | 60-70 | 3MAX | o-Cresol Novolac type for general use | |
| YDCN-702 | 195-220 | 70-80 | 3MAX | o-Cresol Novolac type for general use | |
| YDCN-703 | 195-220 | 75-85 | 3MAX | o-Cresol Novolac type for general use and laminates | |
| YDCN-704 | 195-220 | 85-95 | змах | o-Cresol Novolac type for general use and laminates | |
| YDCN-500 | 195-215 | | ЗМАХ | o-Cresol Novolac type for general use and encapsulation | |
| Brominated Epoxy Resin(Flame Retardant type)"Epo Tohto YDB series" The YDB product is used as a self-extinguishing agent for plastic electrical components. | | | | | |
| < Solid type | | | | | |
| Epo Tohto | Epoxy equivalent | Viscosity (cps/ | Bromine | Description | |

| | Ероху | Viscosity | | |
|---------------|------------|-----------|---------|----------------------------|
| Epo Tohto | equivalent | (cps/ | Bromine | Description |
| grade | weight | 25°C) | content | Description |
| | (g/eq) | (℃) | (wt%) | |
| YDB-360 | 350-370 | 50-60 | 46-50 | High crystallized |
| | | | | For general, laminates and |
| YDB-400 | 380-420 | 64-74 | 46-50 | encapsulation |
| YDB-405 | 530-630 | 90-105 | 49-52 | Insulation powder coationg |
| < Liquid type | > | | | |
| | Ероху | Viscosity | | |
| Epo Tohto | equivalent | (cps/ | Bromine | Description |
| grade | weight | 25°C) | content | |

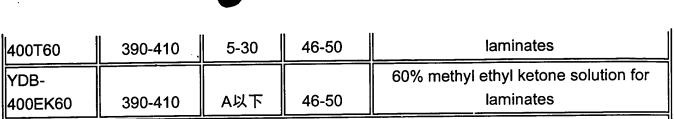
(wt%)

60% toluene solution for phenolic

(mPa·s)

(g/eq)

YDB-



< Low Brominated Liquid type >

| Epoxy equivalent weight | Viscosity (cps/ 25°C) | Bromine content | Description |
|-------------------------------|--------------------------------|---|---|
| (g/eq) | (mPa⋅s) | (wt%) | |
| 450-550 | 1000- 4000 | 19-23 | 80% methyl ethyl ketone solution for laminates |
| | equivalent weight (g/eq) | equivalent weight (cps/25°C) (g/eq) (mPa·s) 1000- | equivalent weight (cps/ Bromine content) (g/eq) (mPa·s) (wt%) 1000- |

Glycidyl Amine Type Epoxy Resins

The four epoxide groups in the resin are highly reactive as cross-linker and hence cured film shows a high level of thermal and chemical resistance.

| | Ероху | Viscosity | | |
|--------------------|----------------------|----------------|-----------|---|
| Epo Tohto grade | equivalent weight | (cps/ 25°C) | Color | Description |
| | (g/eq) | (mPa·s) | (gardner) | |
| YH-434 | 110-130 | 8000- 18000 | 12MAX | 4-functional(tetra glycidyl diamino disphenylmethane) for CFRP |
| YH-434L | 110-130 | 5000- 10000 | | 4-functional(tetra glycidyl diamino disphenylmethane) for CFRP, low viscosity |

Dimer Acid / Rubber Modified Type Epoxy Resins

These flexible film epoxy resins are based on bisphenol A structure which is modified by dimer acids, diglycidyl ester, rubber, tertiary alphatic acid, etc, as described below.

| | Ероху | Viscosity | | |
|-----------|------------|-----------|-----------|---|
| Epo Tohto | equivalent | cps/ | | Description |
| grade | weight | 25°C) | Color | Description |
| | (g/eq) | (mPa·s) | (gardner) | |
| YD-171 | 390-470 | 400-900 | 12MAX | Diglycidyl ester of dimer acid |
| YD-172 | 600-700 | | 6MAX | Diglycidyl ester of dimer acid |
| YR-450 | 400-500 | 25万-45万 | 12MAX | Rubber modified DGE of Bis A |
| | | 2000- | | Liquid rubber modified triglycidyl ether of |

| EPOXY grade | iistانو | | | Page 6 of |
|--------------------|-------------------------------|-----------------------------|-------------|---|
| YR-207 | 175-205 | 4000 | 10MAX | trimethylol propane |
| YD-716 | 305-330 | 2500- 5000 | ЗМАХ | DGE of propylene oxide modified Bis A |
| High Weathe | rable Epoxy R | esins(Hydro | genated Bis | A Type) |
| Epo Tohto grade | Epoxy equivalent weight | Viscosity (cps/ 25°C) | Color | Description |
| (g/eq) | (mPa·s) | (gardner) | | |
| ST-3000 | 225-235 | 2500- 4000 | 1MAX | For Paints |
| ST-5080 | 550-650 | 78-88 | 1MAX | For powder coatings |
| ST-5100 | 900-1100 | 95-105 | 1MAX | For powder coatings |
| ST-4000D | 650-750 | 85-100 | 1MAX | For powder coatings |
| ST-4100D | 900-1100 | 95-110 | 1MAX | For powder coatings |
| | | | | e) by its low viscosity and excellent adhesio |
| Epo Tohto grade | Epoxy equivalent weight | Viscosity (cps/ 25°C) | Color | Description |
| | (g/eq) | (mPa·s) | (gardner) | |
| YH-300 | 135-200 | 100-200 | 1MAX | Tri-glycidyl ether of trimethylol |
| YH-301 | 145-165 | 180-220 | 1MAX | adhesives and paints |
| YH-315 | 165-180 | 700-100 | 1MAX | Modified tri-glycidyl ether of trimethylol |
| | | 0500 | | I |

Castings grade Epoxy Resins

YH-324

YH-325

185-200

175-190

The casting grade epoxy resins are normally cured by acid anhydride hardeners to meet electrical specifications as well as low shrink requirements especially for transformers, insulator, gate switches, etc.

1MAX

1MAX

propane for adhesive and paints

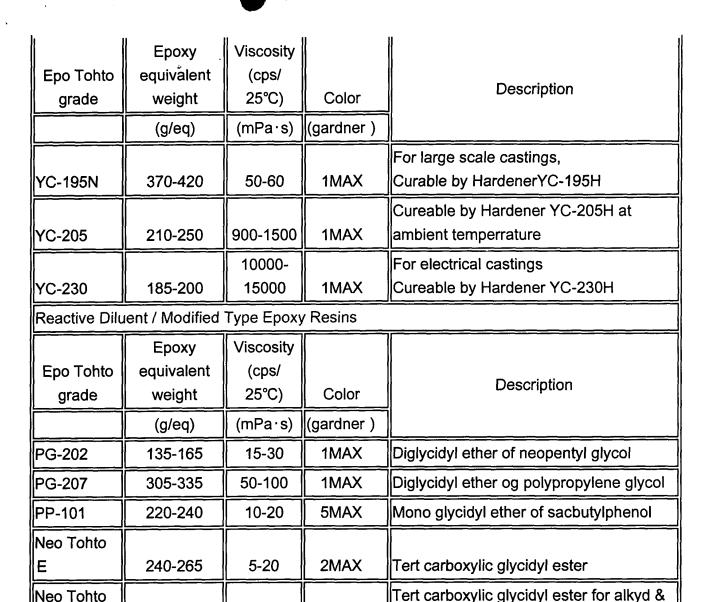
propane for adhesive and paints

3500-

5500

4000-

6000



Phenoxy Resins (Pheno Tohto)

240-260

The Pheno Tohto series is a phenoxy resin high containing alcoholic hydroxyl as shown belolw which is produced from bisphenol A and epichlorohydrin.

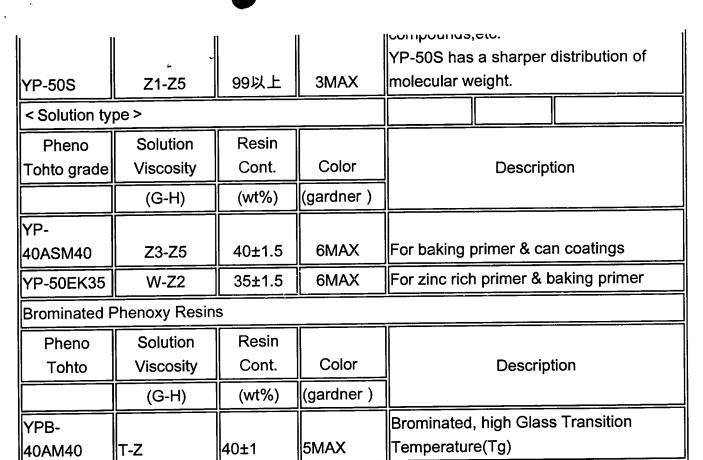
1MAX

acrylate

5-15

Pheno Tohto YP-50 and YP-50S are thermoplastic, and therefore are used on its own for paints, moldings, adhesives and others. In addition the Pheno Tohto may be used as thermosetting resin when it is cross-linked by amino resins, isocyanate,etc.

| Pheno | Solution | Solid | | |
|-------------|-----------|---------|-----------|--------------------------------------|
| Tohto grade | Viscosity | Content | Color | Description |
| Solid type | (G-H) | (%) | (gardner) | |
| | | | | For magnetic tape, PCM primer can, |
| YP-50 | Z1-Z5 | 99以上 | 3MAX | coatings,hot melt adhesives, molding |



Lastest up date April 2000

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